UNITED NATIONS
ECONOMIC COMMISSION FOR AFRICA

POLICIES AND STRATEGIES FOR THE DEVELOPMENT AND UTILIZATION OF NATURAL RESOURCES AND ENERGY IN AFRICA

ADDIS ABABA, JULY 1994

POLICIES AND STRATEGIES FOR THE DEVELOPMENT AND UTILIZATION OF NATURAL RESOURCES AND ENERGY IN AFRICA

UNITED NATIONS ECONOMIC COMMISSION FOR AFRICA
July 1994

Distr: GENERAL

ECA/NRD/AD-HOC/94

Original: English

REPORT OF THE AD-HOC EXPERT GROUP MEETING ON POLICIES AND STRATEGIES FOR THE DEVELOPMENT AND UTILIZATION OF NATURAL RESOURCES AND ENERGY.

27 JUNE - 1 JULY 1994, ADDIS ABABA, ETHIOPIA

REPORT OF THE AD-HOC EXPERT GROUP MEETING ON POLICIES AND STRATEGIES FOR THE DEVELOPMENT AND STRATEGIES OF NATURAL RESOURCES AND ENERGY IN AFRICA

1. The Ad-Hoc Expert Group Meeting on Policies and Strategies for the Development of Natural Resources and Energy in Africa, was held at the United Nations Economic Commission for Africa (ECA) from 27 June to 1 July 1994.

2. The meeting was included in the work programme of the ECA for 1994 and convened to evaluate the present situation in Africa, to formulate recommendations and provide guidelines to governments, donors, international and regional organizations and the private sector, aiming at enhancing the sustainable development of natural resources and energy at national, sub-regional and regional levels.

I. OPENING OF THE MEETING

3. In his opening statement, Mr. Layashi Yaker, the ECA Executive Secretary thanked the selected African High level Experts in the field of Natural Resources and Energy, for having positively responded to ECA's invitation to come and debate on " Policies and Strategies for the Development of Natural Resources and Energy in Africa"

4. He then mentioned that the Experts were meeting at a time when African economies were in transition on several fronts and that, added to the role Natural Resources and Energy were expected to play in the socio-economic development of Africa, explained the importance the UNECA attached to the Ad-Hoc Experts Group Meeting on "Policies and Strategies for the Development of Natural Resources and Energy in Africa".

5. The Executive Secretary then mentioned certain facts on the situation of each of the main sectors of Natural Resources, and focused on capacity building, with regard to this sector. It was important, he underlined that, "a strong support structure be established for the implementation of all the market-oriented investment policies/strategies set up or being set up by African countries".

6. Mr. Yaker concluded by stating that the UNECA's intention was to maintain this Ad-hoc Expert Group Meeting as a high level advisory group, and to consult it on a regular basis.

II. ELECTION OF THE OFFICERS

7. Ms. Fatma Abdel Rahman Attia, Director, Groundwater, Research Institute for Groundwater, Egypt, was elected to chair the plenary comprising the first and last sessions dedicated to an overview of policies and strategies for the development and utilization of natural resources and energy in Africa, and conclusions and recommendations respectively.

8. One coordinator and one rapporteur were elected for each main sector.

Mineral Resources

Coordinator: Angoran Yed Esai , former Minister of Mines and Energy (Côte d'Ivoire)

Rapporteur: Wodaje Abebe, Director, ARDCO (Ethiopia)

Water Resources

Coordinator: Abubakar Bobboi Jauro, Executive Secretary, Lake Chad Basin Commission, N'Djamena (Chad)

Rapporteur: Nii Boi Ayibotele, Director, Water Resources Research Institute, Accra (Ghana)

Resource Information

Coordinator: Professor Peter Adeniyi, Lagos (Nigeria)

Rapporteur: M. Nkambwe, Gaborone (Botswana)

Energy

Coordinator: Jose Pedro Tonet, Head Energy Conservation Department, Luanda (Angola)

Rapporteur : Bonfils Sibi, Directeur Adjoint, Institut de l'Energie des pays Francophones, Quebec (Canada)

III. ADOPTION OF AGENDA

9. The following agenda was adopted:

1. Opening session

2. Overview of policies and strategies for the development and utilization of natural resources and energy in Africa.

3. Policies and strategies for the development and utilization of mineral resources in Africa

4. Policies and strategies for the development and utilization of water resources in Africa

5. Policies and strategies for the development and management of energy in Africa

6. Policies and strategies for the development and management of resource information in Africa

7. Conclusions and recommendations

8. Closing session

IV. ATTENDANCE

10. The Meeting was attended by selected high level experts on the main sectors of Natural Resources and Energy Development and invited observers (list attached).

V. ACCOUNT OF PROCEEDINGS

11. Twenty two papers were presented as summarized below and each of which were discussed by the participants that formed the basis for the recommendations on each sector as attached.

An overview of policies and strategies for the development and utilization of natural resources and energy in Africa (Item 2 of the Agenda)

12. The Director of the UNECA Natural Resources Division introduced this paper. He first referred to the concept of natural resources and mentioned that "empirically a natural resource was anything found by man in his environment which he may in some way utilise for his own benefit". But he stressed and emphasized on the potential usability of that element, and underlined (a) the knowledge and technical skills allowing the extraction and utilization of the said element and; (b) its demand, as the two basic preconditions to be satisfied before the concerned material was classified as a natural resource.

13. He then considered the role of natural resources in the development of a country, and underlined that economic growth was understood as the conversion of natural resources into goods and services and therefore, a country well endowed with natural resources was likely to be economically well off than a country poorly endowed.

14. In pursuing his presentation he made reference to (a) the major problems confronting Africa in the field of natural resources development as defined in the Lagos Plan of Action and(b) the solutions to these problems proposed by the same Plan of Action.

15. The role of science and technology in the development of natural resources was highlighted and its importance was underscored.

16. He also recalled the need for an integrated approach covering different economic and social activities, including natural resources activities, which should take into account the interdependence of these activities.

17. Talking about the natural resources consumption patterns, he mentioned that in line with Agenda 21, developing countries should seek to achieve sustainable consumption patterns, in their development process, guaranteeing the provision of basic needs for the poor.

18. He then concluded his introductory statement by urging countries to (a) develop their endogenous capacities;(b) promote indigenous investment capacities;(c) attract foreign investment and (d) promote intra-African cooperation among member States in the field of natural resources.

19. In the ensuring discussion, participants made comments on and endorsed the need for developing indigenous capacities for development and utilization of African natural resources stressing the need for subregional and regional cooperation and protection of the environment.

Policies and strategies for mineral resources development and utilization in Africa (Item 3 of the Agenda)

Summary of the papers

20. Under this theme, papers were presented by the ECA secretariat and by Participants.

21. Introducing the ECA's paper, a representative of the secretariat mentioned that since countries achieved independence, more particularly since the 1970s, the problem of mineral resources development and utilization has been considered at many fora and in many studies. Whether organized or initiated at the national, subregional, regional or international level, these meetings and studies have generally resulted in the adoption of resolutions, motions and recommendations, aimed at improving or enhancing the role of mineral resources in the development of African countries.

22. He then added that the objective pursued under all these various initiatives unfortunately were far from being attained and to date, the contribution of the vast mineral resources of Africa to the socio-economic development of its people has remained insignificant.

23. The ECA representative went on recalling some of the measures adopted at continental and subregional policy meetings, among which the Lagos Summit of African Heads of State which gave birth to the Lagos Plan of Action and the five sessions of the UNECA Regional Conference on Mineral Resources Development and Utilization in Africa as well as the Treaty establishing the Economic Community of Africa.

24. He further underscored the main reasons for the poor contribution of mineral resources to the socio- economic progress in Africa. The reasons cited included(a) the outward looking nature of the African mining Industry;(b) the poor integration of the mining industry in other socio-economic sectors;(c) the week multinational dimension of the mining industry and(d) the insufficient consideration of other natural resources.

25. Finally he outlined the main issues around which remedial policies and strategies would be built. These issues included the (a)improvement of the living conditions of the vast majority of the people;(b) the integration of mineral sector into a comprehensive plan for socio-economic development, at national, subregional and regional levels;(c) the subregional and regional dimensions of mineral resources development and utilization; and (d) the strengthening of the financial power of producer countries.

26. Mr. Y.I. Angoran from **Côte d'Ivoire**, first made some general observations on policies and strategies in the field of mineral resources and mentioned that the last decade of the twentieth

century was characterized by the worldwide dominance of the so -called "free market economies". He went on stating that as far as the development of mineral resources was concerned, what matters more was the availability of investment funds. Since the indigenous financial resources for some reasons were inadequate, private investment funds were very much needed by the continent. But for private initiatives to be active on a successful and sustainable basis, he added, there must be a favourable environment for investment in every one of the countries for mineral activities. He then analyzed the technical aspects and the required means of implementation of(a) the mineral exploration;(b)the mineral development and;(c) the utilization of mineral resources.

30. Regarding the exploration stage, he underlined the six ingredients which, according to him, led to exploration success. These ingredients included(a) a good geology;(b) a positive macro-economic Government policy ;(c) sound economic guidelines;(d) scientific and technical skills;(e) mutual trust between decision makers and field teams and (f) a well versed and sizeable exploration team.

31. As to the mineral development, he indicated that most projects set up with the above mentioned success ingredients could always be financed. Since private funds were needed by the Continent and that there was competition between countries in attracting foreign capital, good mining legislations were important, and with regard to this aspect, the licensing and financing of small scale mining projects were of special interest because it was a practical way to create jobs.

32. As to the utilization of mineral resources, he said that it was tightly linked to the industrial base of the country in which these resources were to be developed. Favourable industrial regulations with adequate human resources consisting of relatively cheap and skilled labour were key factors, a basic infrastructure would greatly help promote an industrial base conducive to the utilization of mineral resources.

33. Mr. David E.H. Murangari from **Zimbabwe**, in his paper, gave a general review of the changes which have taken place in the minerals industry in Africa, analyzed the current trends in this sector, and made some proposals for the future.

34. He first recalled that the partition of Africa was spurred by the desire of European powers to acquire sources of raw materials, most dominantly mineral raw materials. During the colonial era, the capital, technology and skills which developed these minerals came from outside of Africa. The minerals production of the continent was wholly exported to Europe where minerals were processed and used.

35. In the post-colonial era, two major events occurred: first a decline in confidence by investors to inject new capital in the mining sector of the newly independent countries, then the

desire of these countries to benefit from the revenues of their mining sector. Policies aimed at asserting State control over mineral resources and directing mining revenues flow to the Government. But as it later turned out, exploration activity and minerals production declined for many reasons: (a) decline in minerals prices; (b) inadequate domestic funds; (c) insufficient foreign investment funds.

36. Since 1989, African countries taking into consideration the 1970s -1980s experience were designing new ideas to attract funds for mineral exploration and development. Mining legislations were being revamped, and more incentives granted to investors. But sometimes the range of terms offered by countries demonstrated the extent of desperation which each country may have found itself economically and there was a danger that at the end, some of the incentives and the resultant development programs would end up not being sustainable in the long term.

37. Regarding the policy and strategy proposals, Mr. Murangari underlined the issues around which remedial policies and strategies should be built:(a) enhancement of the life of people;(b) clear and concise mining legislation;(d)linkage of the mining sector to other economic sectors;(e) local processing of mineral resources;(f) regional cooperation in exploration and development of mineral resources;(g) need to balance incentives to foreign investors and incentives to investors of the host country;(h) environmental protection;(i) regional cooperation in minerals assessment and mapping;(k) promotion of both pure and applied research in the field of minerals.

38. Mr. N. Frick, Director of the Geological Survey of **South Africa** first stated that over the past thirty years, the living standards of Africa had declined, this in spite of the fact that the Continent contributed a very significant portion of the world's mineral raw materials. The question, he added, was how Africa would reverse these declining socio-economic trends, and what role could minerals play in that process.

39. He further supplied data on exploration and mineral development in the 1990's. During 1992, $1.8 billion was spent on mineral exploration worlwide. The share of Africa in this investment was very small, and disturbingly focussed on gold exploration with no down stream economic linkage. The situation was more critical regarding the rate of investment into mineral or metal production facilities: processing facilities were absent from the African projects retained. In brief, Africa in general was not at present high on the agenda for mineral exploration and that whatever exploration that was taking place was mainly for gold. Africa with the exception of South Africa, was not considered at all, concerning the new mineral processing and refining capacity currently being created. Talking further about the exploration and mineral development requirements, Mr. Frick, referred to some studies on the subject, the results of which showed that Africa was not considered by foreign mining companies as a prospective area of the world for exploration, and that the geological risk of the continent was just too high to warrant attention.

41. The Continent, he went on, did not consume much of its processed (outside) materials, because the final products had to be imported at great costs, with declining currencies. This low consumption led to discentives to develop new local refining capabilities because the domestic markets were too small to justify the investment expenditure.

42. The Director of the Geological Survey of South Africa also mentioned that the present situation of Africa was strongly influenced by the macro- economic- policies of the Governments of the day. Citing President Mandela, he said that the destiny of Africa did not lie in fate but it lied in the African themselves. The fundamental principle which underlied this philosophy was that the State role will be only to reduce investment risks and that the African polpulation should carry out any developmental work or investment. A conducive macro-economic policy should therefore be put in place in Africa, and for that, it was necessary to redefine the role of the State and to implement(a) private ownership;(b) no State involvement;(c) individual freedom;(d) maximum deregulation; (f) a total free market economy;(g) economic empowerment of the citizens;(h) absolute minimum taxes;(h) role of State as a risk reducing institution.

43. Before concluding his presentation, Mr. Frick pointed out that since the developed countries had very limited requirements to develop new physical infrastructure in the mineral sector, it was likely that the production of metals would decline . As a consequence of this decline, prices of manufactured commodities would increase and prices of raw materials would decline. With the currencies devaluation adding to this situation, it woul be very difficult for Africa to build its infrastructure. The continent's alternative to this situation would be to focus on its indigenous raw materials and on the processing of these raw materials to meet its demands. The Government, he further stated, could play a positive role in stimulating the consumption of local raw matreials and metals by concentrating on the use of local raw materials and metals for the development of physical infrastructure and by encouraging the use of local raw materials in the private sector construction and agriculture industries through appropriate research and the development of appropriate technologies.

45. Mr. Kwasi Barning from **Ghana** first reviewed the status of the mining industry of his country before 1985, the date at which new mining policies were implemented, and then discussed the policies and strategies in the Ghanaian mining sector.

46. Regarding policies, the driving force was the rehabilitation of the Ghanaian economy as a whole. A package of macro-economic policies was designed, aimed at realigning relative prices in favour of productive sectors, in order to increase productivity, financial position of the public sector and encourage the expansion of private investment. With regard to mining sector, in short term, the basic policy objective was to half the decline in production by (a) rehabilitating capital equipment;(b) upgrading local infrastructure;(c) providing working capital and (d)improving management of existing ventures. In long term, legal policies conducive to investment in new mining ventures and encouraging expansion of existing mines were to be instituted.

47. As for strategies, they were essentially aimed at improving the investment climate of Ghana in the mining sector. New mineral and mining laws were promulgated; existing supervisory and regulatory institutions were strengthened and where desirable new ones created.

48. Another basic policy objective in the long term was the lessening of State participation in State owned-mines through the process of privatization. Already one gold mine has been completely privatized while negotiations for the divestiture of four remaining mines was almost completed.

49. Another step taken by the Government concerned small scale gold mining. Recognizing the potential of that such sector, the Government legalised it. The legalisation had an impact on the production, processing and sale of gold.

50. Mr. Barning also indicated that protection of the environment was given due attention. Controls have been put in place so that the country's mineral resources could be developed in an environmentally sustainable manner and a comprehensive legislation was being prepared, to regulate the effects of mining on the environment.

51. Finally he pointed out that industrial minerals which over the past had been neglected, were now being given attention, for their development could provide linkages to the other sectors of the Ghanaian economy. After mentioning some promotional activities undertaken by the Government of his country to promote investment, activities which included the publishing of an investment promotion brochure; the award of licences to private companies to provide mining support services and; the establishment of a mineral data base, he concluded by stating that, as a result of the policy measures and strategies adopted, the Ghanaian mining industry was witnessing a phenomenal growth over the last eight years.

52. Mr. Wodadje Abebe, Director of the Addis Resources Development Company **(ARDCO)** of Ethiopia gave a point of view of a representative of the sector on some aspects of mineral development in Africa. After an analysis of the perception of the different players in the African mining sector, players which included the Government of a host country, the public of that country and the investor, he suggested possible approaches to rectify the imbalance between the Continent's mineral potential and the insignificant contribution of these minerals to the betterment of the standard of living of the peoples in Africa. Furthermore, the foreign investor expected after discovery of an economical deposit, handsome profits from its development.

53. According to the Director of ARDCO, the role of the Government was to influence the pace of mineral development by enacting and administrating appropriate mining legislation. He mentioned that with the recent development in international politics, Governments of African countries which over the past were largely responsible for the running of their mines, were now

adopting a capitalistic form of development. New mining codes were being established, but at their level, the perception that the granting of licenses to investors was more a favour done to him to take advantage of national resources was still prevalent.

54. As to the public, because of lack of information and the state of poverty in which they were, they saw any hint of mineral discovered as a sign of better life to come. They expected jobs, a better infrastructure, clean drinking water. For those living far from the mining area, they expected that mining revenues will help bring about development in other economic sectors. In brief the African public looked positively to any mining related activity.

55. Investors were of two kinds: local and foreign. The local investor, a businessman or an occasional mining professional suffered from lack of tradition and know how. If he belonged to a country with significant mining tradition under the colonial era, this tradition had been forgotten due to the decrease in investor interest as a result of nationalizations and better terms somewhere else. So most of local investors made their money out of trading and services, and more recently out of speculation and small scale mining. Finally the local investor, limited by his ability to raise capital and dependant on imported technology, remained in the small scale mining activities unless he gets carried by a foreign investor for as little contribution as possible.

56. The foreign investor had the required mining experience or could buy new technology. Being familiar with African customs and traditions of doing things, he expected high level of efficiency in the bureaucracy; stability of the political system and; long term viability of working in Africa.

57. As to the goals of the different players, African Governments were very keen to maximize their income from mining activities through various taxes and levies. The African Governments wanted also to take advantage of mining development projects to get political gains. Goals of the public were well known: job opportunities, improved social infrastructure, improved living standards, etc.

61. The Director of ARDCO then analyzed the components of mineral development which should be addressed. These included certain preconditions, other related factors and the operational environment.

62. The preinvestment decision preconditions were dictated by the concern of the investor to minimize the risk inherent in the mining sector. They included peace and stable Government in the country; existence of a clear mineral development policy; conversion of that policy into a workable legal framework.

63. As to the other factors, they included the appraising of the availability of mineral resources, finance and the mobilization of know-how. Whatever the state of the data and the possibilities of access to these data, the investor evaluated available information. If a geological target could be identified he would start working on ways and means of financing his activities.

64. Regarding finance the foreign investor could raise capital for an attractive project but governments could also play a role to ease the burden of raising capital for mining projects in their respective countries.

65. As for the transfer of mineral development know-how, the foreign investor was usually assumed to have the know-how or was better placed to purchase it. Government could assist by readily issuing work permits to foreign skilled manpower, exempting them from the payment of local personal income taxes and simplifying associated bureaucratic requirements, but the investor should be ready to transfer knowhow to capable nationals by hiring and training them with the aim of replacing expatriates with local personnel.

66. Mr Wodadje went on to mention that the operational environment was the target of focus for investors. This environment related to the access to incentive packages; the access to technical information; the adherence to the law and rules and regulations; equal treatment of investors; the access to favourable international marketing arrangements etc..

67. He concluded by stating that optimal utilization of minerals could only be achieved if vertical and horizontal integration could be achieved. A way out of this could be the integration of capacities at the subregional level to achieve the desired economics of scale. A market integration for minerals and mineral products of the region and a concerted effort to achieve a fair price for Africa's minerals at the international market place would help increase the use of African mineral resources.

68. In the ensuing debate, participants asked some information about the amount allocated by the African Development Bank to the African mining sector and made some comments on the concept of the sustainable development of mineral resources. They also wanted(a) to know if the lack of understanding between the decision makers and field people were not one of the causes of failures in exploration activities and (b)if the Continent had entrepreneurs in the mining sector.

69. In response, the secretariat indicated that ADB, under the umbrella of the Industry sector had financed some projects in the mining sector, for example in Rwanda(peat); Ethiopia(gold deposits of Lega-Dembi); Burundi (phosphate rock) and in some SADDC member States. The secretariat did not have the total amount injected by ADB in the mining sector since its inception, but could provide some figures for some projects. For example, over the last ten years, ADB has

granted US 2.5 billion to SADCC for mining projects. Ethiopia received in 1987, $ US 17.08 million for its Lega Dembi gold project. The secretariat also indicated that(a) according to ADB's lending policy, there was no ceiling in terms of the amount of resources that could be allocated to Governments mining projects although the Bank had certain guidelines concerning the total allocation of resources to the Industry as a whole;(b) private investors could be allocated up to 40% of the total amount of the foreign currency component of the project.

70. With regard to the concept of sustainable development, participants insisted on the need to use the revenues from the mining sector for the development of other economic sectors to create conditions for a continuous socio- economic development of Africa.

71. Regarding the relation between decision makers and field workers, the secretariat pointed out that in some countries decision makers were" technocrats" and that helped the understanding between them and the field workers. In some countries structures such as the Minerals Commission in Ghana have been established to advise decision makers on the orderly development of the mineral industry.

72. As to local entrepreneurs, the secretariat's view was that it was necessary to create indigenous entrepreneurs. The African Governments had a great role to play in fostering indigenous entrepreneurs by identifying some opportunities for them and by facilitating their access to Science and Technology.

Conclusions

73. The "Ad-hoc expert group meeting on policies and strategies for the development of natural resources and energy in Africa", convened in Addis Ababa from 27 June - 1 July 1994 by UNECA, having analyzed and discussed the status of development of the African mineral industry:

- Taking into consideration the resolutions and guidelines for mineral resources development and utilization in Africa as embodied in the Lagos Plan of Action (1980); the five reports of the sessions of the Regional Conferences on the Development and Utilization of Mineral Resources in Africa, (Arusha, Tanzania, 1981; Lusaka, Zambia, 1985; Kampala, Uganda, 1988; Ouagadougou, Burkina Faso, 1991 and Addis Ababa, Ethiopia, 1993); and in the articles related to mineral resources development of the Treaty establishing the African Economic Community (June 1991);

- Taking cognisance of the fact that Africa remains an exporter of mineral and energy raw materials with insignificant consumption of these raw materials to support indigenous industrialisation;

- Taking into account the continuous decline in mineral commodity prices;

- Considering the disturbingly poor integration of the mining sector in Africa at national, subregional and regional levels with other economic and social sectors, such as manufacturing, agriculture, housing, communications and other services;

- Considering the ongoing privatisation drive and the accompanying policy and legal framework being formulated in many African countries;

- Taking into account the general under development of the mineral resources and the low demand and consumption of minerals in Africa;

- Noting the low contribution of mining towards meeting the daily needs of the vast majority of the African population;

- Noting the successful contribution of mineral industries to the socio-economic development in Asia and Latin America, and the relative failure in Africa;

- Noting that Africa presently suffers from a very low international priority as an investment target for the world's mining companies, particularly in the non gold mining sector.

- Considering the poor international focus and competitivity of the African mining companies and corporation to participate as economic players on the world's market places, and taking into consideration the effects of the provisions of the GATT agreement as embodied in the Marakesh agreement;

- Noting the very low to non-existence of across border investments in mineral related industries in Africa and the very limited number of trans-African Multinational Companies and Corporations in the sector;

- Noting the institutional weakness of the geological, scientific and technological research organizations in Africa, with the consequent lack of good quality basic natural resource and technical information;

- Recognising the inevitability that Africa will have to join the competitive global village market without any provisions to protect the African economy from world competition;

- Recognizing that Africa must reconstruct and develop its socio-economic, and physical infrastructure and realising the critical role that minerals, will have to play in this reconstruction;

74. The experts:

(a) urge the African governments to clearly define and implement macro-economic policies which will demarcate the roles of policy makers, the civil service and the private sectors;

(b) Encourage African governments to implement measures to ensure free and stable economic, policy and legal frameworks which guarantee the security of property and investments, and the unhindered operation of exploration, mining, processing and manufacturing activities by developers and investors within the defined macro-economic policies;

(c) Urge African governments to strengthen and direct their civil service and science institutes to map, document, research, publish, identify and promote opportunities for investment and development in the mineral industries on a multi-commodity and multi-sectoral basis, for national and international investors and developers;

(d) Urge African governments to recognise the crucial role which private entrepreneurs, companies and enterprises play in identifying, developing and marketing commodities in minerals and that steps be taken to develop, assist in all possible ways including searching for mineral development finance and promoting the growth of indigenous entrepreneurs as well as the attraction of transnational and international entrepreneurs or enterprises in the mineral sectors to African countries;

(e) In the context of encouraging new entrepreneurs as above, urge African governments to promote organised small mining which provides opportunities for employment for numerous unskilled rural population and also enhance government revenue;

(f) Urge African governments to ensure that mineral incentives are based on sound business principles and accountable within a free market system;

(g) encourage African governments to recognise the urgency and necessity for the formation of internal capital markets and stock exchanges to facilitate the development of the mineral industries; active steps should be taken to promote the establishment of such non-governmental institutes to raise capital for new ventures and to permit the entire population to share in the profits of economic ventures;

(h) Encourage African governments to promote investment in mineral development by the private sector without prejudicing the participation of the state through

cofinancing beneficiation facilities where this is economically accountable.

(i) Stress that African governments must recognize the economic necessity and realities of pan-African multi-sectoral economic integration in the development of mineral resources and must take active steps to encourage and enable transnational trade, the movement of goods, capital and services and to promote the establishment of transnational companies and enterprises in Africa;

(j) Call upon African governments to realise that mining, mineral processing and metal production constitutes an international, free market business and that international markets determine the viability of ventures; African governments should therefore encourage and promote beneficiation wherever the economic and technical circumstances are most favourable and optimal, taking into account the need to integrate the mining sector with other sectors of the economy at national, subregional and regional levels.

(k) Recognize the importance of down stream linkages between mining, beneficiation and manufacturing and therefore urge African governments to encourage national enterprises and entrepreneurs to form alliances with down stream or up stream enterprises regionally and internationally;

(l) Urge African governments to strengthen and support their scientific and technological institutes to assemble, curate and distribute for public use technological, geological, processing, manufacturing and marketing, information to address both internal socio-economic and external export needs;

(m) Urge African governments to ensure that regular contact takes places between understanding at national, subregional and regional levels, and to jointly foster research and development projects and programmes in mineral development activities;

(n) Urge African governments and mineral development operators to ensure that mineral resources exploitation and development are conducted in an environmentally sustainable manner;

(o) Urge African governments to declare a decade of natural and energy development with appropriate objectives and programmes whereby the highest competent authorities including mineral development operators would meet at least on a biennial basis to assess the implementation of the programmes and further promote the development of these sectors;

Policies and Strategies for the Development and Utilization of Water Resources in Africa (Agenda Item 4)

Introduction

75. The availability of water resources in Africa is characterized by a striking paradox. On one side Africa contains many of the world largest water systems and bodies; the river Nile, the river Congo (Zaire) and lake Victoria, which all combine to evoke a picture of abundance of water resources. On the other side of the picture are the Sahara (the largest desert in the world), the Kalahari, and a large expanse of arid and semi-arid zones to the north and south of the humid equatorial region and signs of distress and devastation in many parts caused by prolonged drought spells and water scarcity conditions.

76. The coefficient of evaporation in Africa is the highest in the world and the run-off factor is almost half that of the world average. The limited water resources are not evenly distributed and most areas are vulnerable to severe droughts and result in human misery.

77. About 50% of the total water resources of the continent are in one single basin, the Congo and 75% of the total water resources are concentrated in eight major river basins. Over 70% of the land area of Africa is within the basins of transboundary rivers and groundwater bodies. Out of 200 major international river basins in the world, 57 are in Africa. North and south flowing rivers passing through the arid and semi-arid zones constitute about 20% of Africa's total water resources and most of them are characterized by seasonal and annual variabilities.

78. The groundwater resources in Africa are about 20% of the total water resources. They provide limited supplies for drinking and irrigation. On the other hand, groundwater development in many places is constrained due to natural (see water intrusion, deep aquifers) or human activities (over exploitation, pollution). Moreover, groundwater management and protection is not receiving enough attention due to lack of hydrogeological information.

79. The need to mobilize Africa's water resources to support the social and economic development was given emphasise in the Lagos Plan of Action (1980). Furthermore the African Regional Preparatory Meeting (1977) for the UN Water Conference set out the policies, strategies and guidelines to mobilize the continents water resources for socio-economic development in the areas of agriculture including livestock and fisheries, health, industry, energy, transportation and recreation.

80. In spite of the above efforts improvement in the food production in the continent has been minimal over the past decade. Also not more than 6.5% of the cultivable area is under

irrigation. Of this area, over 60% are found in Egypt, Sudan and Morocco. The region continues to be faced with food shortage crises and increases dependence on imported food. It is estimated that food imports by year 2000 will amount to some 49 million tons. It is therefore no wonder that nutritional level is below the global average.

81. The improvement in health from portable water supply and sanitation did not fare so well either over the decade. By mid 1993, 54% and 64% of the African regional population did not have safe drinking water supply and proper sanitation respectively.

82. Other social and economic indicators show that the population in 1991 was 625 million and growing at the rate of 3.0% per annum is expected to reach 867 million by the year 2000. The average GDP per capita was $513 in 1990. The infant mortality rate for the region in 1991 was 76 per 1000 births while life expectancy was 52 years. The adult literacy rate ranged from 18% to 72%. These indicators are unfavourable compared with other regions of the world.

83. It is believed that if the water resources of the region had been developed as expected its contribution to socio-economic development would have been better than portrayed above.

Summary of presentations of papers

84. Preceding the introduction of the papers on water resources policies and strategies, the Chief of Water, Environment, and Marine Section (WEMS) made an introductory remark recalling that human resources have been wrongly used as tools for development instead of as the basis and driving force for development. He also commented that the role of governments in the development of natural resources should be the creation of proper environment that encourages the private sector.

85. Subsequent to the above remarks, presentations of the following five papers were made. A brief summary of the presentations is as follows:

i) African Water Resources Situation, Key Issues and Strategies (by Mr. Yilma Wolde Emmanuel - UNECA Secretariat)

86. In the introduction of his paper, the expert from UNECA made reference to the Mar del Plata Action Plan which provided a broad framework for water resources development in a global perspective. Attention was drawn that in the context of Africa, the Lagos Plan of Action has provided a guideline with a sharper focus to water resources development in Africa. The presentation included a reflection on the general feature of water resources of Africa. The contrast in abundance and scarcity of water in the different climatic regions of the continent

including the impacts of climate change as well as the reduced availability of this resource, because of its vulnerability by mismanagement was highlighted. The Striking feature that 50% of the total surface water resources of the continent in a single basin of the Congo/Zaire was underlined. A reflection was also made on groundwater occurrence and limitations of knowledge of this resource. It was pointed out that water resources plays a crucial role in all socio-economic development activities, in combating drought and in environmental management and that it should be carefully used and wisely managed.

87. The expert referred to the key issues pertaining to institutions. In this regard, the problems related to coordination of water activities at all levels; the inadequacy and lack thereof of water legislation; the inappropriate deployment, underutilization and inefficient or non-utilization of human resources and weaknesses in policies and planning were pointed out. In each of these areas, strategies and policy options were outlined.

88. In the subsequent presentation a synopsis of the state-of-art relative to water resources assessment, water quality and impacts of climate change; drinking water supply and sanitation; water for agriculture; sub-regional cooperation and river lake/basin development; and floods and droughts was highlighted in which an appraisal of situation analysis including development constraints were elaborated. The overall assessment revealed that the pace of development in each of the above areas has been very disconcerting. In view of the need to bring about progress in development in the above specific sectors, a proposal for new strategies and approaches to be adopted was made. The strategies encapsulated the required action to rectify some glaring errors drawing from the unfoldments of past experiences. Emphasis was made on the need to conceive water resources programmes in holistic manner taking into account linkages and interactions of water activities with other socio-economic development sectors. In this regard, attention was called to the need that development should be guided by sound policies and planning principles thus avoiding disruption of environmental and ecological equilibrium in the effort of catering to meet present requirements.

89. The expert concluded his presentation by making reference to Chapter 18 of Agenda 21 of the Rio Conference in 1992 and emphasized that development of water resources should be based on sustainability in keeping with the Rio principles.

ii) Policies and Strategies for the Development of Water Resources in Africa (by Mr. Nii Boi Ayibotele - Director Water Resources Research Institute, Accra, Ghana)

90. In introducing his paper, the expert from Ghana drew attention that at the center of the objectives of all development, the goal is to improve the socio-economic conditions of the population of Africa. Reference was made of the different water resources in Africa (river/lake resources, and groundwater) and the amount of water consumption for agricultural, domestic and industrial uses. In making reference to the global outlook with an estimated surface runoff of

4570 km^3 per annum, it was noted that by the year 2000, Africa will not utilize more than 7 percent of this amount for consumptive uses.

91. The key issues facing African water resources development and management were identified to be:

a. Population pressure with an annual growth rate of 3.2 percent (1990-2000);
b. Climate variability, uneven distribution of water resources and occurrence of drought;
c. Inadequate hydrological, physiological, and land use information for assessment of water resources;
d. Inadequate attention to land and water interaction and environmental issues.

92. Other development constraints were enumerated to be:

a. inadequate institutional infrastructures, legal instruments and planning principles;
b. inadequate cost recovery policies;
c. ineffective operation and maintenance procedures;
d. poor or inadequate mechanisms for developing transboundary waters;
e. inadequate human resources for planning and managing water resources; and
f. lack of sufficient public participation and beneficiaries and particularly women.

93. In concluding his presentation, the expert recommended that to overcome development constraints of the sector, appropriate population policies should be drawn up; adequate institutional infrastructures and legal instruments for proper planning and sustainable development of the water sector should be put in place, sustainability of water projects should be improved by introducing cost recovery and tariff policies; assessment of water resources should be properly carried out by taking advantage of the World Bank/UNDP Sub-Saharan African Hydrological Assessment Project, action should be taken to improve and meet human resources needs, participation of beneficiaries/local communities should be encouraged; action should be taken to establish and/or strengthen basin organizations and planning should be conceived by integrating water resources management with land use management and thereby take into account environmental questions.

iii. Overall Policies and Strategies for Groundwater Development and Management in Africa with Emphasis on Egypt (by Ms. Abdel Rahman Attia, Director, Water Research Center, Cairo, Egypt)

94. In introducing her paper, the expert from Egypt underlined that the water resources situation in Africa is under critical pressure of various types. It was recalled that although water

is abundant in some parts of the African region, even in those parts poor conservation has resulted in high losses. The case of the Nile, where more than 6 percent (104 billion m^3/yr) of the rainfall is lost through evaporation, was quoted to illustrate losses despite critical stress prevailing in some of the co-basin states.

95. It was noted that groundwater resources in Africa are about 20 percent of the total water resources and that they provide limited surplus for drinking and irrigation purposes. Constraints impeding development of groundwater in many countries were mentioned to be natural causes (i.e. see water intrusion, deep aquifers) and man's activities (i.e. over exploitation, pollution). It was also noted that groundwater management and protection are not receiving adequate attention partly due to lack of hydrogeological information.

96. As regards the major issues affecting sustainability and beneficial uses of water resources, mention was made of the following aspects: absence of water conservation schemes and inefficient water uses; lack of inter-institutional cooperation for water resources planning and development; poor management practices of transnational water bodies; inadequate data and problems of access to procure available data; inadequate or poor public awareness; problems of environmental management; and inadequate and lack of water tariffs and cost recovery policies.

97. The paper highlighted the major concerns of groundwater development and management in Egypt. It gave a brief account on the availability of water-bearing formations, their potential for exploitation and the methods used in the conservation and conjunctive use of surface and groundwater resources.

98. In concluding her presentation, the expert outlined a set of action recommendations to enhancing integrated water resources development at national, sub-regional and regional levels, taking into account the multi-purpose uses of water, and keeping in mind the economic return of exploiting fossil water and sustainability of water development. Other recommendations included promotion of public awareness, choice of technology, encouraging popular participation and education and training.

iv. Regional and Sub-regional Cooperation with Focus on Transboundary River/Lake Basin Development (by Mr. Abubakar B. Jauro, Executive Secretary, Lake Chad Basin Commission-LCBC)

99. In introducing his paper, the Executive Secretary of LCBC pointed out that the term cooperation holds the concept of "an understanding involving two parties or more" and that paternalistic donor-recipient relationships should not overshadow mutual cooperation for water resources management and sustainable development in Africa. In the context of Africa, the attempts and experiences, mechanisms for cooperation and the experience of LCBC as an organ for sub-regional cooperation as well as the efforts of the United Nations in the 1950s for the

promotion of integrated river basin development were cited.

100. It was pointed that internationally shared water resources covered 47 percent of the earth surface and 60 percent of Africa and Latin America. In the face of climatic change that is affecting water availability, the need for cooperation among African countries sharing common basins was considered a necessary imperative in keeping with the recommendations of the Mar del Plata Action Plan (MPAP), the Dublin Conference and Agenda 21 all of which called for integrated basin-wide planning and management of water resources.

101. It was revealed that examination of the experience of the six major African river/lake basin institutions for the Senegal, Gambia, Niger, Lake Chad Basin, Kagera and Nile is that they are all faced with problems of financial, institutional, coordination and dialogue with donors. Differences in policies and priorities between the countries themselves and those of donor agencies were also cited as impediments to efforts for cooperation.

102. As regards the framework for sub-regional cooperation, it was pointed out that the international law commission avails the provision which proposes for countries to consult on how to manage their shared water courses, on two principles of equitable distribution and prohibition of significant harm. However, these principles being so flexible were found to be susceptible of being evoked by any riparian country.

103. Regarding the experience of the Lake Chad Basin Commission's experience, besides water, which is a common resource, political, cultural and historical considerations were mentioned as common bondages. In pursuing the presentation, the expert reflected the institutional set-up of the commission, its functions and achievements. As an illustration of achievements, mention was made of activities undertaken including studies and developments in the fields of telecommunications, roads, joint regulations on fauna and flora, border demarcation and maintaining security within the basin area. The engagement to tackle environmental degradation and drought and desertification was pointed out among the main preoccupations. In particular the activity concerning the fight to saving the Lake Chad itself which shrank to 1/10 of its original size in the 60s was mentioned as a top priority concern. In this regard, the diagnostic study undertaken by UNEP and UNSO in association with the member countries of LCBC was regarded as crucial particularly that it drew up a master plan to address major issues to be tackled among which is the plan for inter-basin water transfer from Upper Ubangi Basin to the Lake Chad Basin to save the lake.

104. The presentation was wound up by underscoring the need for cooperation and outlining action recommendations pertaining to developing policies and strategies, creation and/or strengthening institutions and required support from UN agencies to enable implementation by countries of relevant part of agenda 21.

v. Water Use for Agricultural and Irrigation Development in the African Region - in the Framework of Agenda 21 (by Mr. Y. A. Mageed - Consultant/Former Minister of Agriculture in Sudan)

105. This paper was presented by the chief of WEMS on behalf of the expert who could not participate at the Ad-hoc Expert Group Meeting. In the introduction, the uneven spatial and temporal distribution of water with most parts of the African continent being distressed and devastated due to water scarcity was emphasized. The point was made that the coefficient of evaporation in Africa is the highest in the world and that the runoff factor is almost half of the world.

106. The importance of water resources to drinking water and very small-scale irrigation, and the need to plan for optimum utilization of this resource through well considered policies and programmes were underscored. Reference was made to the Mar del Plata Action Plan (1977) which provided a broad framework for improvement of existing irrigation, developing efficient new irrigation, and for improving and extending rain-fed agriculture for increasing food production. Similarly, it was noted that the consultation on irrigation in Africa, (Harare-1984) concerned itself with the food crisis problem in the continent caused by prolonged drought. This was followed by the consultation of LOME (1986) which elaborated policy options and strategies and formulation of national action programmes to attain irrigation development objectives in Africa. It was recalled that the total cultivated area in Africa at the time of the consultation was about 124 million ha of which 116 were rain-fed. The contribution of irrigation which forms 6.5 percent of the total cultivated area was mentioned to constitute 20 percent of the production value.

107. It was noted that the international Action Programme in Water and Sustainable Agricultural Development (IAP-WASAD) outlined priority areas for action including some common measures and proposals that constituted a ten-year programme which is embodied in Chapter 18 of Agenda 21. The African Agenda for Action recognizing the seriousness of environmental degradation, climatic crisis, population pressure in the natural resources base underscored that Africa faces very important challenges to formulate an agenda for action within the framework of agenda 21 in the programme area of water for sustainable food production and rural development. In this regard, the need to analyze physical, technical, and institutional problems that affect the different climatic sub-regions and thereby identify solutions and recommendations that would address basic needs and requirements for sustainable development was emphasized.

108. In the area of cooperation on transboundary river/lake basins the Dublin Conference endorsement on the need for preparation and implementation of integrated management was cited. It was pointed out that cooperation must be built upon the basis of equality, sovereignty and territorial integrity of all riparian states. An observation was made that African

transboundary basins are witnessing environmental degradation which would require basin-wide cooperation. In this regard, the concept of sharing the waters of the basins need to be broadened and taken in the context of sustainable development and maintenance of the basin environment.

109. The presentation was concluded by drawing attention to the various problems encountered in areas of agriculture and food production making the African region a major importer of the product and that to avert this situation there was a strong need to develop appropriate policies and strategies that take into account all interacting elements.

Summary of discussions

Institutions, Policy and Planning

110. During the discussion that followed the presentations, a number of points were raised. Participants noted the range of institutional problems constraining development of the water sector. The problems of coordination within the sector itself and with other socio-economic development sectors was seen to be critical. The lack of adequate and clear policies and weaknesses in planning were also recognized. In view of the above situations which have been major obstacles to development of the water sector participants underscored the need for countries to take appropriate steps that would improve the rate of progress.The set of recommendations and action proposals for the water sector as a whole is prepared and compiled in a separate paper.

Water Sector Activities

111. Note was taken of the disconcerting situation in regard to drinking water supply situation, the poor maintenance and operation of facilities for drinking water and the problem of cost recovery and other associated issues. Similarly the deterioration of networks for water resources data assessment were noted. In the agriculture sector also participants were concerned that the sector has not been doing well such that Africa has become a major importer of food and agricultural products. In recognition of the situation and the underlying reasons that have contributed to the worsening state of affairs a set of remedial measures were outlined.

Agriculture water use,Inter-basin water transfer and Desert reclamation-

112. On the question of inter-basin water transfer and high-technology desert reclamation for irrigation which the secretariat paper did not favour for reason of technological complexity and

cost (in the context of the African situation), some participants noted that where other alternatives do not exist countries may have no option but venture on such schemes. In the case of inter-basin water transfer note was made that certain basins may be water deficient while others may have surplus water. Under such circumstances countries, may, with due regard to riparian interests in the case of shared water resources, consider water transfers as a solution to their irrigation and other development aspirations. It was emphasized that when developments of this nature are contemplated careful examination of their technical, economic and environmental implications are made so that development proceeds in a sustained manner. Similarly it was noted that countries left with no other option to expand their irrigation aside of reclaiming desert areas would be forced to do so. Under such circumstances participants underscored the need for countries to exhaustively look into all development options and exercise due care in considering the limitations of water from international river systems on which other development schemes might also depend. Participants emphasized that optimization of water use and minimization of negative consequences should be given a very high consideration in desert reclamation projects.

113. In the ensuing discussion concerning small-scale irrigation developments for food production, it was noted that such schemes are best limited to supplemental irrigation for peasant farmers and small-scale cash crop and vegetable production. It was also noted that small- and large-scale irrigation should not be considered exclusive of each other since countries can successfully run side by side small- and large-scale irrigation schemes.

114. As regards the view expressed on the bias of developments favouring irrigation and hydropower (which projects themselves have not been totally successful), without giving consideration to other water-oriented allied projects many comments were made by participants. One point of view justified the move as being essential since the action is demand-driven and is targeted to respond to pressing needs. This was said to be acceptable as long as future considerations to include other uses are not preempted in the design and implementation of the projects. Another point of view although did not in principle disagree with the preceding point emphasized on the need to consider other uses of water such as fisheries, livestock development, recreation etc. at project conception stage in preparing to launch irrigation and hydropower schemes even though these may be primary needs. To support this point of view reference was made to Chapter 18 of Agenda 21 which calls for multi-purpose integrated development approach. Comments were also made that the linkages and interfaces of the water sector with mining, energy, fisheries,livestock development,human settlement,tourism etc. should be maintained to realize sustainable development.

Investment Questions and Donor and Recipient Policy Issues

115. The discussion centered around the question of attracting investment to the water sector by mobilizing domestic resources and seeking increased participation by donors and bi-

laterals.Comments were made of the need to harmonize donor aid policies and programmes so that they are consistent with development objectives of recipient countries. As regards NGOs it was noted that problems have been encountered since they run water programmes in isolation from national water organizations with no reference to the priorities and programmes of recipient countries.In this connection it was deemed essential that NGOs work closely with national water organizations with a view to enhancing standardization of equipment and scheme designs, to promote sustainability of water systems, and to improve the national database on hydrogeological information.

116. Some participants expressed the view that investment/finance goes hand-in-hand with absorptive capacity. Further, poor maintenance and operation and the lack of sustainability of water systems were cited to be major problems that have made donors shy away from stepping in to support water programmes in Africa.In this regard the need to take all possible measures that would help keep water facilities and schemes operational is underscored. It was noted that such moves would go a long way to restore donor confidence and at the same time would ultimately enable the attainment of the fundamental objectives of socio-economic improvement for the majority of the African population.

117. In pursuing the discussion attention was drawn to Chapter 18 of Agenda 21 which underlined that water has an economic value on basis of which private investment/privatization should be encouraged for its development. Governments were seen to be playing the role of facilitator by creating the proper environment and by providing policy guidelines, legislation and frameworks that encourage entrepreneurship. As a working example of privatization the experience of Cote d'Ivoire was cited and that whenever feasible it was recommended to encourage such moves. Concern was expressed by some participants on the privatization of the rural sector as their experience shows that in many instances it is the state that bears the total capital cost and beneficiaries are required to bear only the operation and maintenance costs and even this being stressful on their meager income. In line with this perspective many participants were of the view that privatization could possibly work better in urban water supply systems than in rural settings. This view was taken further to say that unlike situations in developed countries, in the developing ones especially in Africa where because of the social and health values associated with water, governments cannot afford to be neutral on development of this sector. It was noted from experience that the role of governments in most cases in Africa has been direct and this trend is likely to continue for some time in the future.

Human Resources

118. Discussions concerning the human resources aspect focussed on the inefficient use, poor deployment and misallocation of qualified personnel by governments in Africa. The non-utilization of highly trained, skilled and qualified professionals is mentioned to be common place

in Africa. It was noted that this has discouraged many nationals to work for their countries and look for employment outside thus giving rise to the brain-drain problem that is increasingly becoming a disturbing issue. Comments were made that this problem prevails while at the same time shortage of human resources is cited to be a critical constraint to development. Consequently Africa is paying heavily to get the services of expatriate expertise.

118a. The meeting emphasized the need to correct this anomaly especially in the perspective of realizing the theme of the 35th anniversary of UNECA which was "Building Critical Capacities in Africa for Accelerated Growth and Development". Again referring to the issue of many educated people being unemployed, participants expressed concern this might discourage many youngsters not to aspire for higher learning if ultimately education and training do not enable them secure jobs. In this regard views were expressed by other participants who said that the perception of education should not be for job guarantee but rather to equip the individual to be a creator of jobs. In agreeing to the basic principle of this concept some participants expressed doubt if the outlook could be taken at its face value in most countries of the region where the environment is not conducive to encouraging private entrepreneurship.

118b. In the final analysis a consensus was reached that in the face of critical trained human resource in Africa, which resource has also to be paid for dearly if secured from outside, the need for governments to properly deploy and effectively utilize their trained staff and make all possible efforts to retain their human resources was emphasized.

119. In view of the fact that Africa is facing a problem to formulate its water development programme in the context of Chapter 18 of Agenda mainly because of shortages of human and financial resources the mobilization of technical and financial assistance by donors, aid-agencies and the United Nations system of organizations in a coherent manner is seen to be a very vital input.

Subregional Cooperation

120. During the discussion on this subject, it was noted that in Africa while there are only about six river/lake basin organizations even these few have not been successful as member States have not shown enthusiasm to support sustainance of the organizations. This indifference was attributed to be caused by the uncertainty of the benefits that the countries would get in return. In this regard it was suggested to include "incentives for cooperation" i.e clear statements of benefits for the member States in a river basin organization as a break through to this impediment.

121. The meeting noted that there was need for river basin organizations to work hard towards increasing their efficiency and effectiveness and cut down their overhead costs with a view to restoring the confidence of their member States and regain their political commitment and

financial support. In view of the fact that previous attempts were targeted at ambitious programmes which were partly reasons for failure , it was emphasized to adopt minimum programmes that respond to the needs of member countries. The curtailment of top-heavy institutions to reduce recurrent costs and the consideration of merits rather than using political grounds in the appointment of executive heads of river/lake basin organizations were strongly recommended to surmount the prevailing problem facing the organizations. During the ensuing discussion many participants commented that river/lake basins were most suited for integrated multi-purpose planning leading to optimum and sustainable development and affording possibilities for incorporating the question of equity to yield high dividend to cooperating states. In realizing the vast opportunities that could accrue from multi-purpose and basin-wide planning it was recommended to adopt river/lake basins as planning and development entities.

Water Resources Development, Management and Improving Water Use Efficiency

122. Concerning this aspect the discussion centered around the experiences of the ongoing Egyptian programme of improvement of irrigation systems as a relevant example for African countries. The programme was noted to comprise of improvement of water conveyance channels with lining of canals and improvement of control structures to reduce losses from seepage and waste. It was also noted that the programme includes improvement of irrigation practices and building of night storage tanks.

123. The consensus view was expressed of the need to develop and conserve water resources, and whenever feasible to encourage conjunctive use of surface and groundwater resources in a rational and efficient manner. With regard to groundwater, note was made that this resource is vulnerable since heavy extraction could result in drying of wells, in significant decline in the water levels of aquifers with consequent impact preventing recharge capability and in salt water intrusion especially in coastal regions. In view of the above observations it was recommended to apply great caution in the exploitation and management of this resource.

124. On the question of water resources development and health implications, note was made of the fact that Africa is a continent whose population suffers heavily (80 percent) from water-borne diseases. Aside of infectious worm-diseases that lead to debilitating conditions on the large majority of the rural population in the region the problem of river blindness was noted to be a very disturbing one in areas like the Zambezi region. In this regard it was recommended to give special consideration to the problem of water-borne and water-related diseases.

Recommendations

125. The Ad-hoc Expert Group examined the reasons for the poor performance of the water sector in Africa and identified the following major issues and problems as underlying causes and recommended corresponding policies and strategies to deal with them.

Population Pressure

126. High population growth rate is putting pressure on the land and water resources in Africa. This is increasing the demand for basic needs at a rate faster than countries are able to meet. It is also depleting and degrading resources.

> It is therefore recommended that African government assisted by the appropriate international organizations formulate population policies that take into account the consumptive water requirement for drinking purposes and for food production at different standards of living, various production technologies, and water shortage that may arise out of climate change.

Water Resources Assessment

127. The assessment of water resources which is a prerequisite for water resources planning, design, operation and maintenance, has not been given the attention it deserves. Progress made in the decades of the 60s and 70s have been lost.

> It is recommended that African governments improve the assessment of their water resources by improving and expanding data collection on all aspects of the hydrological cycle (including groundwater, sediment transport and water quality). It is highly recommended to develop data banks, use of GIS, adopt methodologies for analyzing data that are appropriate to the various climatic regions and also incorporate the impact of climate change. They should take advantage of the World Bank/UNDP Sub-Saharan Hydrological Assessment Project that is currently going on to rehabilitate, improve and strengthen their hydrological services.

Institutional Aspects

128. Institutions for planning and managing water resources have had their responsibilities fragmented among various sectoral ministries and administrative agencies. These have hindered co-ordination and impeded attempts to integrate water management activities within the sector

itself and with other sector development programmes at the national level.

To overcome these problems it is proposed that national focal points like water resources Commissions, Boards or Ministries for Water Resources be established to be responsible for the formulation of overall water policies and ensuring their implementation. They should also co-ordinate water resources planing and management at the national level, and provide effective linkages with the social and economic sectors dealing with agriculture, health, industry including mining, energy, transportation and also with finance and economic planning.

Water Legislation

129. Water legislations in many countries are fragmented in various enactments, some of which are even not known. In many cases the necessary regulations have not been passed to enable the provisions of the main laws to be implemented.

It is therefore recommended that countries which have not already done so reform their water laws so that they deal comprehensively with: a) water allocation and abstraction from surface and groundwater sources; b) waste discharges into water bodies (surface & groundwater) from point and non-point sources (agriculture, human settlements, industry and mining), and (c) land use and land degradation.

Water Pricing and Cost Recovery

130. There has been lack of appreciation that water in addition to its social importance, has an economic value which must be treated as such in all its competing uses. This has affected the sustainability of projects. As funds for operation and maintenance, expansion and rehabilitation of water projects in particular for drinking and irrigation purposes have not been fully recovered. Governments have attempted to take on the responsibility to provide these funds but have been unable to do so.

To overcome these problems it is recommended that African governments should formulate clear cost recovery and tariff policies which will take into account costs of investment, operation and maintenance, system expansion, replacement and return on investment. In order to avoid adverse effects on the poor and disadvantaged sections of the populations full cost recovery must be a goal to be attained gradually and over time.

Operation and Maintenance

131. In many countries water supply projects particularly for drinking and irrigation purposes are not operating as designed and constructed. This is due to poor operation and maintenance. Consequently many systems lose considerable amount of water through leakages and seepage.

> To overcome the above and conserve water it is recommended that countries improve their operation and maintenance practices taking into consideration the preparation of O&M manuals, the provision of spare parts, proper training of their O&M staff to follow approved procedures and improve their supervision.

Human Resources Development

132. The shortage of adequate human resources with skills and experience in the scientific, technical, economic, financial and managerial functions required for proper conservation, development and management of water resources at all levels has been a crucial constraint to effective performance of most water agencies. In spite of the fact that many people have been trained in various fields, there are deficiencies in areas like economic and financial analysis of water projects. Also most trained people have not been retained in their jobs because of poor employment conditions and lack of job satisfaction.

> It is recommended that governments improve human resources development policies taking into account: a) manpower surveys and needs assessment at all levels; (b) implementation of appropriate education and training programmes particularly for middle level technicians c) effective utilization of trained manpower, and (d) improvement in employment conditions.

Transboundary Cooperation

133. With over 57 transboundary river/lake/ groundwater basins in the region it would have been expected that co-operation in the development of transboundary water resources for the socio-economic development of riparian countries on an integrated and equitable basis would have been seriously addressed and proper mechanisms for co-operation established. The

mechanisms for existing basin institutions have been constrained by (a) absence of clearly designated and mandated agencies to act on behalf of their countries; (b) technical and managerial weaknesses at the level of the Secretariats of the basin authorities; (c) inadequate funding by member states of the basin authorities; (d) inability to mobilize external funds for pre-investment studies and investment; and (e) politicization of the selection of key personnel.

> In view of the above it is recommended that countries sharing the same basin should co-operate to develop their water resources in an integrated, holistic and basin wide manner on a fair and equitable basis to meet their just socio-economic development goals. In this regard they should set up institutions with clear mandates to promote co-operation, and development, they should also provide adequate financial and political support to the institutions and where such institutions do not exist they should be set up. Further UN agencies dealing with water resources should encourage and support African countries to implement the relevant portion of Chapter 18 of Agenda 21.

Integrated Land and Water Management

134. The lack of proper linkages between the water agencies and the economic sectors in which water plays a role have adversely affected effective management. Similarly the lack of appreciation of the impact of water management on the land and vice versa have further compounded the issue. Consequently, the environmental impacts of water and land development on each other have not been taken as integral parts of such development.

> It is therefore recommended that African countries recognize the linkage between land and water resources and develop policies that will integrate land and water resources development and management in a holistic manner using the river basin as a unit. This should take account of social, economic, land cover, land use data in addition to climate, hydrological and water resources data. It should also take into account environmental impacts and their dynamics and measures to eliminate or minimize adverse effects. The policies should recognize the multi-objective nature of the above approach to management which will also require multi-disciplinary teams trained in the techniques of systems analysis incorporating risk and uncertainty.

Popular Participation

135. One of the contributing factors to the failure of many water projects in the region has been due to nonparticipation or non-involvement of the beneficiaries particularly women. This has created a centralized top-down supply driven approach to water supplies.

> To overcome the adverse effects of the above approach it is recommended that countries formulate policies that will decentralize the activities of water agencies to the local level and promote a demand driven approach especially for drinking and irrigation water supply. It should involve the beneficiaries in planning, choice of technology, installation, operation and maintenance, fixing of tariffs, system management and ownership.

Privatization

136. The involvement of the public sector in the development and management of water resources has been a common practice in the region. In view of the inherent inefficiency of the public sector most public service agencies have contributed to the poor performance over the years.

> To correct the situation, it is recommended that governments divest themselves as far it is practicable from the development and management of water resources and confine themselves to regulatory functions. The private sector should be brought in to provide consulting, constructing, operation and maintenance and other services.

Water Resources Conservation

137. There are many regions in the continent where there are water crises (a) on a permanent basis because demand is outstripping the available resources (e.g North Africa); (b) on a seasonal basis in the dry season, (eg. Ghana) (c) or because water resources are deficient (eg. Sahel), (d) or because of persistent or recurrent drought (e.g. Lake Chad Basin, Ethiopia). Almost all African countries are affected by one or more of the above conditions.

> It is therefore recommended that countries formulate policies to conserve water both quantitatively and qualitatively taking into account the need to:
>
> a) Build dams to conserve water in the wet season to use in the dry season.
> b) Increase efficiency in the use of water for drinking water and irrigation

systems by minimizing losses from leakages and infiltration.

c) Recycle used water.

d) Develop unconventional sources of water like treated waste water, brackish groundwater and desalinate sea water.

e) Develop methods for water harvesting and groundwater recharge.

f) Enforce water legislation with regard to abstraction (particularly in coastal areas to prevent sea water intrusion) and also control effluent discharges from human settlements, industry and agriculture.

g) Develop policies for the management of fossil ground water.

h) Transfer water from basins with adequate water resources to those that are deficient, bearing in mind the need to take into account riparian rights and environmental impacts.

Donor Policies

138. It was noted that the different donor policies and conditionalities including those of the NGOs that countries have had to contend with had contributed to the slow pace of development in the water sector. In some cases these have not been consistent with the needs of recipient countries.

It is recommended that donor agencies stream line their aid policies so as to speed up the planning and implementation of projects. NGOs should also offer their assistance within the framework of the water programmes of the recipient countries.

Policies and strategies for the development and utilization of energy in Africa (Agenda item 5)

Summary of the papers

139. Under this agenda item, the following six papers were presented at the meeting:

- Energy policies and strategies in Africa by the Secretariat;
- Energy situation within ECOWAS by Mr. Amadou Diallo;
- Options for Energy and Environment by Dr. Jean-Philippe Thomas of ENDA Tiers-Monde;
- Presentation of EGL: Activities and Programme by Mr. Simanga Ngovi-Ngulu, Director General;
- PRISME: An international programme on support of energy efficiency by Sibi Bonfils, Deputy Director IEPF;
- Community Building and Cooperation: A SADC Experience by Jose P. Tonet.

140. A representative of the Secretariat opened the session in informing the meeting that an ad hoc meeting for Senior Advisers on energy strategy and policies was held in Addis Ababa, in May 1993, and that its recommendations had been taken into consideration in the preparation of the paper on "Energy Policies and Strategies in Africa" to be presented at the meeting.

141. In the paper, it was pointed out that the central objective of energy policies remained to increase security of supply in both the short and long term in order to sustain economic growth. It was added that public concern for energy security might have weakened with the decline of energy prices and that public knowledge of environmental problems and risks associated with the development of the energy sector had increased and concerns had intensified.

142. Therefore, there was a necessity to jointly promoting both energy and environmental policies giving due weight to respective consideration when formulating policies in both areas.

143. The meeting was informed that, according to a recent World Bank study, on a global scale, the production and use of energy accounted for between 50 and 60 percent of the greenhouse trace gas emissions in the atmosphere while energy and deforestation accounted for about 49 and 14 percent of the global sectoral contribution to greenhouse gases respectively.

144. It was acknowledged that Africa was endowed with abundant primary energy resources, such as hydroelectric power (about 1,630 TWh per annum of gross potential), oil (about 8.6 billion tonnes or 60.4 billion barrels of estimated reserves), natural gas (about 8,600 billion cubic meters of proven reserves), coal (about 60 billion tonnes estimated reserves of which 55 billion tonnes for the Republic of South Africa), substantial reserves of peat and lignite and considerable

potential in new and renewable sources of energy.

145. Some policy options related to the development of these resources were presented on aspects such as: reviewing legal and fiscal regimes in oil and gas sector in order to encourage investments in the upstream activities (exploration and development); increasing the role of non-oil energy sources; addressing rural energy steady supplies, energy efficiency and conservation and financing of energy investments; energy and the environment, energy and human resources development and energy pricing and taxation as well as the institutional arrangements.

146. The presentation was concluded by stating that opportunities existed for mutually beneficial cooperation on subregional level among African countries in the area of electricity trade through interconnection of grids, joint investment in the development of extra-national hydropower resources and joint procurement of petroleum products where economies of scale could be exploited.

147. Mr. Amadou Diallo, chief of Energy Division of the ECOWAS Secretariat described the energy situation in member countries of the subregion. The main points of his presentation had to do with the energy potential of the subregion in terms of hydropower, lignite, plant waste, petroleum, natural gas, uranium, coal and so on.

148. He then described the energy production and consumption patterns in the subregion with specific reference to primary energy, the basic generation and the transmission of electric power in the subregion, the interconnection of electrical grids, the ECOWAS energy policy and on-going programmes that ECOWAS was pursuing in terms of energy cooperation.

149. There was a community cooperation programme in the supply and distribution of petroleum products and gas. Hydropower was being developed and electrical grids in the subregion being interconnected in line with the power generation and transmission masterplan. Studies were being conducted on member States needs for new and renewable energy facilities and plans made to establish a manufacturing plant for such equipment. Along with this, ECOWAS was proceeding with the institution of an information system on new and renewable energy sources.

150. Mr. Jean P. Thomas, from Energy Programme - ENDA TIERS-MONDE, presented a paper on "energy and the environment in Africa". First of all, he said that the objective of ENDA T-M, an international NGO, was to work with grassroots people and institutions and to support research into development alternatives. Its methodology was participatory and its energy programme fell within the sustainable development approach which considered Africa's energy problems as an integral part of its environment and development agenda.

151. The prospective assumption was that for Africa to emerge from under development it

would have to effect an unprecedented increase in its number of energy users. And yet, given the difficulty of developing local energy resources and the high dependence on imported energy, preventive strategies must be pursued with regard to:

(i) energy efficiency to be achieved by final consumers in particular;
(ii) new and renewable energy sources that require to be taken into account;
(iii) the diversity of local solutions by type of renewable and non-renewable energy and by type of technology whether ancient or modern.

152. He pointed out that ENDA operated by means of constant inter-face between research/action/training which, in line with whether the exercise had to do with energy planning, rational use, alternative technology or climate change led to field activities and training of local leadership teams as well as seminars for policymakers.

153. While energy strategies and policies were nothing new, their pursuit required:

(i) capacity building particularly through job-training, local leadership training in energy and environment and other multi-disciplinary approaches;
(ii) the decentralization of energy policy making with the view to addressing local development needs, particularly in the rural areas;
(iii) extensive sharing of experiences and information by data base, E-Mail and conferences among the major players on the energy and environment scene in Africa.

154. Mr. Simanga Ngovi Ngulu, Director General of EGL (Energie des Grands Lacs, an energy affiliate of CEPGL), presented a paper on the activities and programmes outlining the objectives of his organization. He said that the main energy problems faced by the Great Lakes sub-region (Burundi, Rwanda, Zaire) were the following:

(i) over-exploitation of fuelwood resources;
(ii) high cost of imported petroleum products because the three countries are landlocked;
(iii) slowness in integrated planning of the energy system;
(iv) energy pricing non based on economic costs;
(v) weakness in popularization of alternative energy technologies.

155. He stated that the long-term objectives of EGL were to contribute to:

(i) a sustainable economic development by an optimum energy supply to the sub-regional economic system;
(ii) economic integration of the sub-region by initiating regional energy projects such

as interconnection of electrical grids and promotion of the development of common resources;

(iii) lessening costly energy sources imports.

156. He concluded by saying that the CEPGL sub-region was considering its electrical interconnection with Egypt and other West African countries through the development of the huge Inga hydropower potential.

157. Mr. SIBI BONFILS, Deputy Executive Director of IEPF (Institut de l'Energie des Pays ayant en commun l'usage du Francais), informed the meeting about PRISME programme created in 1991 to promote energy efficiency in the developing member countries.

158. He stated that PRISME had a regional approach and was composed of:

(i) national working groups who formulate requirements and execute projects;
(ii) regional coordination, with four groups in Africa based on geographical zones (West Africa, Central and Eastern Africa, Northern Africa and Indian Ocean); and
(iii) a general coordination for an integrated management of the whole programme.

159. Among the achievements of the programme, he mentioned: the setting up of 20 national working groups; the organization of a regional training workshop on energy efficiency in public buildings in Yaounde (May 1993) for 10 national teams from Western and Central Africa in conducting energy audits; the completion of 30 energy audits with a potential of energy savings estimated at 240 million F CFA; and the formulation of a medium-term programme of action during the evaluation session held in Ouagadougou (May 1994).

160. The area of interest for the programme for the coming years are: the organization of a second regional training workshop on energy audits in public buildings for the remaining 10 national groups; the setting up of an adequate institutional framework in member countries; the establishment of a data base for climate parameters processing and another one for the availability and the local prices of energy efficient equipment.

161. He concluded by saying that PRISME was working to strengthen its relationship with other international organizations such as ECA through the GEE21 Project (Global Energy Efficient 21) and project funding facilities such as GEF (Global Environment Fund).

162. The representative of SADC Energy Sector/TAU has mainly focused in his presentation on the recent workshop on "Community Building Programme" held in Windhoek (Namibia) from 11-15 April 1994 which had to consider, among other things, opportunities and constraints in energy development in SADC; SADC energy markets and associated supply scenarios for trade promotion and the need for the establishment of a new institutional framework for cooperation

in the SADC energy sector.

163. In presenting the energy situation in the SADC subregion, he said that fuelwood was the predominant source of energy, accounting for over 75% of total final energy demand. Commercial energy included petroleum products, electricity and to a lesser extent, coal. The annual consumption of petroleum was in order of 4.7 million tonnes totaly imported (except for Angola). Hydro-eletricity constituted 63% of net power supply with 7,548 Mw of total installed capacity supplying a total of 24,410 GWh of electrity while the balance was covered by thermal power generation and imports from South Africa and Zaire.

164. He concluded his presentation by giving the conclusions and recommendations of the workshop. With regard to the benefits of integration, it was recognized that differences in the economic strengths of member States could lead to potenetial conflicts such as stronger economies dominating the weaker ones, especially with the membership of the Republic of South Africa.

Summary of Discussions

165. The presentation of the six papers was followed by a general debate on issues stemming from the questions raised and the clarifications requested by the participants in the meeting, namely: the rationale of rural electrification programmes; the role of new and renewable sources of energy (NRSE) in the rural energy mix; the contribution of natural gas as a cooking fuel in the reduction of deforestation; the interconnection of electrical grids as a means of regional cooperation and economic integration and the privatization of energy state-owned enterprises, etc.

Rationale of rural electrification programmes

166. It was recognized that rural electrification programmes were not economically and financially viable although they contributed to social well-being of the rural populations; the mobilization of the investments required through the traditional sources of funding was not applicable and needed the governmental backing.

167. It was also pointed out that rural mass of population in Africa was poor and no appropriate pricing policy could be implemented to make rural electrification projects viable leading governments to subsidize electricity consumption; electricity for households was also very expensive because of non appropriate and affordable equipment and did not represent a significant share in the spectrum of rural energy requirements.

168. It was agreed that energy in rural areas should emphasize the need for a comprehensive

environmentally sound programme involving appropriate technology for each area with competitive advantage, namely: domestic gas use, fuelwood management, electricity from the grid, NRSE (biogas, solar PV systems, windmills, micro-hydropower, etc.) and energy conservation. This new concept in which different sources of energy (electricity, NRSE and fuelwood) were contributing, as a package, to meet rural energy demand could be called "rural energization".

Contribution of NRSE

169. The meeting noted that NRSE, such as solar PV systems and/or windmills were contributing to electrical or mechanical energy supply in rural and remote areas of many African countries. There were problems of funding such renewable energy technologies and for training technicians to man the energy sector.

Development of natural gas

170. The meeting was informed that, in some African countries, natural gas was being considered as a substitute to traditional fuels for cooking. The CILSS member States for example were implementing a programme of popularizing the utilization of butane gas and kerosene to substitute charcoal for cooking in urban households as a means of reducing deforestation and solving the environmental problems associated with the depletion of fuelwood resources.

171. Projects were being worked out to recover the big amount of associated gas which was actually flared in order to use it as a domestic fuel for cooking or in gas-fired thermal power plants to generate electricity with subsequent reduction of greenhouse gas and particulate emissions in the atmosphere compared to burning charcoal in households or coal and fuel oil in power plants.

Interconnection of electrical grids

172. The representative of three economic subregional groupings informed the meeting that interconnection of electrical grids within their member States was one of the strategies to implement the objective of regional cooperation and economic integration.

173. Many projects were at different stages of preparation in West African subregion, such as the interconnection between Côte d'Ivoire and Burkina Faso and Mali. Information was also provided on the status of the ADB-financed prefeasibility study of the interconnection between

Inga (Zaire) and Aswan (Egypt).

174. The issue of harmonizing the electricity pricing policy and structure within CEPGL member countries was raised during the discussions; this harmonization was considered as a prerequisite for facilitating the exchange of electrical energy among the national electricity supply companies in an interconnected system.

Privatization of energy state-owned enterprises

175. Côte d'Ivoire was the first African country to privatize its electricity supply company (EECI-Energie Electrique de Côte d'Ivoire) for electricity distribution branch of activity only in late 1990. This activity of distribution was entrusted to a sole company, the CIE (Compagnie Ivoirienne d'Electricité), which was able to yield positive results just after one year of operation.

176. Many other African countries were being encouraged by financial institutions to privatize their electricity supply companies. New funding mechanisms, such as BOO/BOOT (Build, Own, Operate and Build, Own, Operate, Transfer) were being implemented to encourage the private sector to invest in power generation.

Development of mineral resouces and energy

177. During the discussions, it was recalled that the mining sector was not only consumer of energy but also producer of energy, i.e. coal and hydrocarbons. The meeting was informed about the establishment of a new Intergovernmental machinery, known as the "Conference of African Ministers responsible for the Development and Utilization of Mineral Resources and Energy and its Committee of Experts" which will permit greater linkage between the two sectors.

Implementation of the Lagos Plan of Action (LPA)

178. In one of the paper presented at the meeting, it was stated that there was no need for drastic changes in the energy policies and strategies formulated in the Lagos Plan of Action. The fact was that, although the current energy situation was completely different from that prevailing shortly after the second oil crisis in 1980, some of the recommendations contained in the LPA were too ambitious and uneasy to implement.

179. Some of those recommendations were still relevant today and being implemented taking into account the increasing concern about the environmental problems and risks associated with the development of the energy sector and the need for using energy more efficiently.

Conclusions

180. The Ad Hoc Expert Group Meeting was convened with the aim of working out, through the presentation of papers and discussions on issues derived from them, policies and strategies for the development of energy resources in Africa. The recommendations adopted by the Ad Hoc meeting are presented in the succeding paragrphs of this report and cover actions to be taken at the national and regional levels as well as the assistance requested from ECA and other multilateral institutions.

Recommendations in the Energy Sector

181. The following are recommendations adopted by the Ad Hoc Expert Group meeting concerning the energy sector.

1. Taking into consideration the energy policies and strategies as emphasized in the Lagos Plan of Action including among other things:

   (i) the lack of an energy policy in most countries and of short, medium-and long-term energy development programmes;

   (ii) the non-integration of energy activities in over-all national development planning efforts;

   (iii) the need to undertake an exhaustive inventory of all energy resources, having regard to their potentials, possible development and utilization, and of energy needs including suitable equipment;

   (iv) the need for African countries to undertake joint action for the development and utilization of existing energy resources on the continent, for which cooperation would have to be initiated or expanded (where it already exists) in the energy field at the subregional and regional levels;

   (v) the difficulties existing in Africa in the transportation of energy, the lack of standardization in the electricity sector, the shortage of qualified manpower (scientists, technicians and management cadres) and the exorbitant prices which African governments have to pay for imported energy and equipment,

2. Taking into account the conclusions and recommendations of the "Ad-Hoc meeting of Senior Advisers on Energy Strategy and Policies" held in Addis Ababa, Ethiopia, 17-19 May 1993.

3. Taking into consideration the new developments and urgencies in energy issues as emphasized in the papers presented at this meeting and the discussions that followed, i.e.:

(i) the institutional and regulatory reforms;

(ii) the acuteness of problems related to rural energy supply;

(iii) the ever dominant part of fuelwood in total energy consumption in many African countries and the role played by women in its collection and utilization;

(iv) the rather negative impact of energy production, conversion, transport, distribution and use on the environment at the global and local levels;

(v) the role of energy efficiency and conservation in mitigating the negative impact on the environment and in improving energy systems performances;

(vi) the growing importance of natural gas as a clean fuel to substitute oil and charcoal in the light of global climate change;

(vii) the maturity of NRSE technologies as appropriate solutions for energy supply problems in remote areas;

(viii) the need for some countries to review their legal and fiscal regimes applicable to oil and gas exploration and development activities;

(ix) the growing role of free market as driving forces for energy sector development;

(x) the increasing competition in international market for financial resources and the resulting scarcity of funds;

182. The Experts:

At National Level

1. Recommend to develop a clear and comprehensive energy policy and planning strategies as part of an overall national policy, taking into account sustainable development in connection with whole social-economic national planning. Countries should create specific national institution in charge of national energy policies and strategies definition and implementation.

2. Recommend use of Integrated Resource Planning (IRP) methodology in order to take into account all alternatives including in particular new and renewable energy, energy efficiency and subregional commodities,

3. Recommend to the countries, to overcome constraint in the regional cooperation and to make available the necessary resources (human, equipment...) for its development.

4. Urge to create for these purposes data base on national and sectorial needs taking into account the present and future environment and the available resources.

5. Recommend the review of the legal and fiscal regimes regarding exploration and development activities and provide for a clear and concise legal and financial framework with appropriate incentives in order to encourage private investment.

6. As for fuelwood, the most important energy source for majority of African countries, recommend to give it more consideration in energy sector development in order to identify the best long term strategies of management.

7. Recommend for energy efficiency and conservation a national policy established by IRP analysis; the creation of adequate institutional framework and structure to coordinate the policies and to deal with the numerous constraints. Utilities should be made interested in improving the whole energy system, and attention should be paid also to transport sector that has already become the most important energy consumer in Africa.

8. Recommend, in order to meet rural population energy need, to use the mix of all local available resources (natural gas, bio-gas, woodfuel, electricity from national grid, solar, wind mills, micro hydro...), making the choice through a least coast analysis, keeping in mind environment and local development constraint.

9. Recommend the development of national capacity (human resources and local teams "energy/environment) to deal with problems regarding the environmental constraint (desertification, deforestation, climate change, etc.)

At Regional Level

10. Recommend the creation and/or strengthening of regional and subregional institutions for the coordination and implementation of energy policies at this level.

11. Recommend preparation of a regional master plan for the development of cooperation in the energy field using Integrated Resources Planning (IRP) methodology.

12. Taking into consideration the above, recommend the setting up an implementation of information system to enable sound decision making.

13. As regarding petroleum, recommend at short term, to implement the project of rationalization of petroleum product supplies and distribution in Sub-Saharan Africa; at long term, recommend implementation of regional shipping, refining, storage and transportation of oil and products. The standardization of products and practices is the first step.

14. As regarding gas development, the meeting appreciated the importance of the ECA studies on up-stream and down-stream development of natural gas resources in Africa and recommended that UNECA and Regional Institutions continue to work vigorously in that direction.

15. Regarding electricity, encourage the on-going regional cooperation in electricity sector through hydroelectricity and interconnection projects. IRP should be applied here to take advantage of the economies of scale and investment optimization.

16. As regarding fuelwood, recommend development of regional strategies for efficient utilization in order to benefit from economies of scale in term of market, research and implementation of appropriate solutions (efficient production and consumption, substitution ...).

17. Encourage the development of new and renewable energy at regional level where the market is of sufficient size to create production unit.

18. Recommend human resource development through regional training sessions and creation and strengthening of professional institution experienced in the studies and projects conducted in the region.

19. Urge regional institutions and member countries to develop self-reliance mechanism in the conception, financing and implementation of regional and national projects.

As Regarding Multi-lateral Cooperation

20. Urge the African Development Bank and other African financial institutions to develop internal expertise in problems regarding energy policies and strategies and energy efficiency in order to assist member countries in implementing such projects.

21. Recommend wide dissemination of infirmation pertaining to a new funding mechanism.

22. Recommend project-oriented training such as PRISME project to built local capacity in dealing with energy sector problems.

As Regarding ECA

23. The meeting expressed its appreciation of ECA effort to organize this Ad Hoc Meeting on Natural Resources and Energy strategies in Africa.

24. With regard to energy policy and strategies in Africa, the meeting, while commending the ECA on what has been done so far, recommends the need to improve upon the present strategies at regional and subregional levels. The ECA is also urged to help subregional economic groupings and institutions in African member States to improve the energy strategies and policies in the context of contemporary thinking on energy, environment and sustainable development.

25. Encourage ECA in its efforts of fund raising for the implementation of Global Energy Efficiency (GEE) 21 Project.

26. Recommend to ECA to prioritize all these recommendation, define modalities for their implementation, the means and responsibility for their execution. An evaluation process of the results should clearly be defined.

Policies and Strategies for the development and management of resource information (Agenda Item 6)

Summary of the papers

183. In this agenda item three papers were presented and discussed. The first paper on **"issues in, and strategies for developing resource information in Africa"** was presented by Prof. Peter O. Adeniyi, from Nigeria, addressing some background considerations in the development and management of natural resources, resource information needs and the generation of data and management of such information, lessons of experiences learned.

184. During the presentation it was stated that despite world-wide progress made in the last two decades in the development of tools for data collection, organisation, integration, analysis and management of natural resources, the major problems facing Africa in this area has not improved much. The major constraints identified were (a) lack of information on the natural resources endowment; (b) lack of capacities with respect to capital, skills and technologies; and (c) considerable dependence on foreign expertise.

185. The issue of determining resource information needs is a fundamental requirement for beneficial incorporation of resource information in the decision making process. For information to play its vital role, the needs to be satisfied must be known. Normally, all institutions (public or private), groups or communities and individuals need a level of information in order to succeed in whatever they are engaged in. Some of these are common, others are specific for the respective institutions, groups or individuals. Inability to properly define information needs presents a major obstacle to the development of indigenous culture in information technology and its use for resource development and management.

186. By the generation of data and management of resource information the following broad categories of activities should be taken into consideration: (a) collection and evaluation of existing data; (b) collection of new data to fill the data gaps identified in above; and (c) data organization, integration, manipulation and generation of information.

187. The main issues affecting the application of resource information technologies such as remote sensing are the profound commitment and understanding at national level on the effective development of scientific and technological capacities for the utilization of these technology to their national development goals, priorities and supporting policies. Most of the industrialized countries and several countries in Asia and Latin America belong to this category in which remote sensing and related fields have been used to contribute tremendously to the state of knowledge and information about their environment, resources and the underlying ecological processes.

188. With regard to the lessons of experience and the future prospects several points which could be very useful for Africa were suggested. Some of these are the importance of indigenous knowledge, the institutional framework, and the legal aspects; the role of agreements and communication; and a proper management.

189. In the concluding remarks it was stated that in view of the absence of favourable conditions for the effective transfer of information technology in Africa in human resources development and institutional capacity building, and the relatively low value accorded to the field of mapping sciences, the current underdevelopment in resource information in Africa cannot easily be alleviated.

190. The second paper **on policies and strategies for the development and management of resource information** was introduced by the chief of the Cartography and Remote Sensing Unit (CRSU) of ECA. The document discussed several issues relating to resource information needs, the nature of spatial information needed, filling mapping and other spatial resource information gaps and some ongoing and proposed programmes on resource information technologies.

191. During the presentation it was indicated that it is difficult to undertake any research work, initiate or carry out any development plan without disposing of effective means for rapid access to selective and up-to-date information in any field of activity.

192. In Africa, it was expressed, negative changes in the domain of natural resources and land use are taking place rapidly under the heavy pressure of population growth. The challenge facing African decision-makers, planners and managers is to reverse the process of degradation and to improve the resource base of their countries. Information on earth resources, land use, land capability, and other geographic trends related phenomena are essential.

193. The information needed for sound management and project execution is a set of numerous subsets of information needs related to each sector. In this regard two main problems have to be solved: firstly, the provision of means for accessing to accurate information on nature, location, extension and availability of resources and other related phenomena. Secondly, the provision of means for integrated analysis of the different types of data that are made available, comprising both internal and external factors.

194. Space technology has brought a new dimension to resource mapping. Satellite and other forms of space imagery are nowadays the best means to collect data on earth resources in a systematic way on global, regional and national basis. Combined with the old techniques and the new ones for image processing, already fully developed and easily available, the analysis of the data, properly modelled, can produce reliable information in short periods of time.

195. Geographic information systems is an additional tool that modern technology has made available to the user community for the analysis of spatial data of earth phenomena, originating from different sources. In these new systems the elements and features of the maps, duly coded are stored in computer graphic files, topologically structured and separated in hierarchical levels on magnetic media and quite recently on optical disks.

196. In the final part of the paper, some ongoing programmes on resource information technologies in Africa were briefly introduced, major constraints affecting the development of these technologies in the region were highlighted and recommendations made.

197. The third paper that was on **"capacity building in using geographical information systems in natural resources management in Sub-Saharan Africa: an example from Botswana"** was presented by Dr. M. Nkambwe, Senior Lecturer, University of Botswana. The paper brought some ideas on how capacity may be rapidly built in Sub-Saharan Africa in using spatial databases in geographic information systems (GIS) to support the management of natural resources.

198. In an introductory part the paper discussed the pressure exerted on the available natural resources as a result of rapid population growth in Sub-Saharan Africa and the demand for improved basic needs. Rapid land degradation, deforestation, and water aquifer depletion in semi-arid areas have been particularly severe. As a result of this the need for a new concept of sustainable development had been suggested in view of the dwindling funds and the diminishing resources.

199. Currently, it was reported that many countries in Africa are building their own GIS databases in order to improve the cross sectoral exchange of data and information which are of common interest. Some of them show certain level of success. However, a common problem for all is the sustainability of their GIS programmes and projects in view of the financial constraints.

200. Most of the capacity building activities is going on at the national level. Though national coordination is absolutely essential for proper GIS development in the country, it is also equally important to establish linkages below the national level so that user needs required at district and local levels can be integrated.

201. Botswana was provided as a case study in the development of capacities at national level. The major characteristic in the case of Botswana is that the main drive came from an informal interest group "the GIS User's Group". It comprised members of the public and private sectors, local and international NGOs, the academic community, and donor agencies. Through this group two important contributions were made: it helped to build up a pool of people in various fields that were very enthusiastic about the introduction of GIS; and

encouraged the official committee responsible for the development of GIS in the country to think of a national framework for the development of GIS.

202. In order to resolve the major constraints confronted some action oriented programmes were launched. These were training programmes intended to alleviate the shortage of the badly needed skilled personnel and support applied research activities.

203. The experience made in Botswana shows that promotion of certain technologies needs the cooperation of the users community. Surely the backing of the government authorities with regard to policy guidelines would be required to ensure a broader acceptance within a country. Though donor's support is critical in capacity building with regard to GIS, it should be born in mind that such an assistance is limited to a certain duration.

Summary of the discussions

204. The discussions that followed the presentations of the three papers are presented here grouped in four topics, namely: Resource Information needs, status and characteristics of existing resource data, development and utilization of remote sensing and geographic information systems (GIS) for data generation and management, and requirements for developing and managing resource information.

Resource Information Needs

205. The group noted that:

i) the determination of resource information needs is a fundamental requirement for the rational incorporation of resource information in the decision-making process;

ii) resource information at varying spatial and temporal resolutions is required for the planning, management and sustainable development of the critical sectors of the African economy such as water, energy, agriculture, forestry, infrastructure, industrial and urban sectors;

iii) topographic and cadastral maps are common information needed for all resource sectors;

iv) baseline information on various resource components (e.g., soil, water, vegetation, geology, climate, etc) is required for the proper planning, development and management of resources;

v) there is an equally important need for information on the current resource use, which, when combined with baseline biophysical and socio-economic information, provides a basis for determining the suitability or otherwise of the current use or that of any proposed development project;

vi) development is about change, hence, there is also a need for information regarding human inducing and natural changes; and

vii) the determination of resource information need should involve the public/private resource information producer and the user community.

Status and Characteristics of Existing Resource Data

206. In considering this issue, it was generally agreed that various types of resource and environment data already exist in Africa but that they are fragmentary and their compilation, organization and use are inhibited by several factors such as:

i) the lack of information on the existing data which is further compounded by the lack of comprehensive documentation on what is available at both national and regional levels; thus searching for what is available is time-consuming and expensive;

ii) incomplete coverage of many African countries with the common information need (e.g., topographic and Cadastral maps) at appropriate scales. As of 19887, the percentage of Africa covered by 1:25,000, 1:50,000 and 1:100,000 topographic maps are 2.5, 34.5 and 19.5 respectively, as against a corresponding world average of 17.3%, 56.4% and 58%;

iii) the fact that comprehensive inventories of many important natural resources and resource use have not been conducted at local, national and regional levels;

iv) the fact that use of the existing general (topographic) and thematic resource information is constrained by:

a) the use of different projections,

b) the use of different classification schemes and nomenclature even for the same resource component,

c) the fact that data are often not registered to common coordinate systems,

d) variations in scale, accuracy, and data history, and

e) the age of the data. Many of the existing topographic maps were produced over 25 years ago, hence, their portrayal of current land use, vegetation and physical infrastructures is out of date;

v) the fact that socio-economic data are often not geo-referenced; hence, their integration with other spatial data is difficult; and

vi) the difficulty of gaining access to the available data. In several cases across Africa, ownership and copyright of data are often not clear or misleading and the mandates of national and regional institutions dealing with various resource components are often not clear with regard to date archiving, dissemination and data sharing.

Development and Utilization of Remote Sensing (RS) and Geographic Information Systems (GIS) for Resource Data Generation and Management

207. In discussing this issue, the expert group noted that:

i) RS is currently the most cost-effective method of generating consistent environmental and resource information at different spatial and temporal resolutions;

ii) GIS has become the most powerful methodology for the organization, integration, analysis and generation of information for decision-making;

iii) since the advent of these technologies, their potentials have been adequately demonstrated in several resource areas including land and water resources inventory and evaluation; geological and mineral exploration; crop inventory, crop condition assessment and production forecast; forest and rangelands inventory and management; soil mapping; weather forecasting; natural and human-inducing disaster assessment and mitigation; assessment and management of coastal and marine environment; planning and management of infrastructure facilities; urban and rural land use planning; environmental monitoring and impact assessment; cartography and mapping - all of which are important to sustainable development of African natural resources;

iv) the efforts to transfer RS and GIS to Africa are yet to lead to their being institutionally adopted, developed and used in most African countries because of several reasons which include:

a) the fact that the value of RS and GIS in providing timely, spatial and integrated information for resource planning, development and management is not well understood by the decision-makers;

b) the lack of appropriate RS/GIS centres in most African countries;

c) the lack of adequate personnel with requisite skills in RS and GIS in most African countries;

d) the lack of local education and training opportunities in the field of RS and GIS in most African countries. Where they exist, they suffer from the lack of infrastructure, staff and funding;

e) lack of non-governmental professional organizations in RS/GIS in nearly all African countries. Thus, the available scientists and engineers not only operate in isolation, they have no collective will to influence their governments;

f) the fact that access to satellite remote sensing data has remained very difficult for most African countries (excluding South Africa). This problem is greatest for western, central and eastern parts of Africa which are not currently covered by any ground receiving station. Compounding the situation is the high cost of the data, lack of foreign exchange and the fact that most of the operating earth observation satellites do not carry on-board recording facilities;

g) the lack of cooperation and coordination among national institutions and among African countries regarding the acquisition, management, and exchange of satellite and other spatial data;

h) the poorly developed and organized scientific community in Africa with particular reference to RS and GIS significantly influenced the development of needed user community in Africa. As a consequence, only very limited indigenous entrepreneurs exist in Africa; and

i) the fact that the majority of RS and GIS projects in Africa are supply-driven, application oriented and dependent on external assistance. Consequently, the execution of these projects continue to depend mostly on foreign experts leading to the sudden death of most of the projects when the foreign experts are withdrawn.

Requirements for Developing and Managing Resource Information

208. In consideration of the above issues, the requirements for the development and management of resource information as identified by the expert group are:

i) the information technology infrastructure not only comprises hardware, software, and data, it also involves local knowledge, people, institutions, laws, agreements and communication. Accordingly, the changes brought about by the introduction of information technology such as RS and GIS must be desired at all levels (e.g., decision-makers, professionals, scientific community, public and private sectors, NGOs, and the general user community);

ii) long-term commitments to, and investments in, the capacity building with a view to developing a critical mass of technicians, professionals and researchers who understand the technology and who are able to adapt, further develop and maintain the technology as well as develop applications methodologies suitable to their local environment;

iii) the creation of an enabling environment that allows easy access to RS data and infrastructure, specifically, the establishment of ground receiving station(s); in this respect, it was agreed that the installation of a portable ground receiving station in Nairobi was a major improvement.

iv) the establishment of national information technology centre with strong RS/GIS component as well as the strengthening of the existing national and regional organizations to develop RS and GIS capability;

v) the formulation and implementation of policies that allow the establishment of horizontal diffusion of RS/GIS technology among the academia, governments, development agencies and private sectors and a vertical diffusion within each sector through communication and information network;

vi) formation of one or more national and regional non-governmental organizations to engage in research and its dissemination, the promotion of a broader public perception of the benefits and use of the technology as well as work with other national, regional and international organizations; and

vii) the establishment of communication and information network among national, regional and international organizations.

Recommendations in resource information

209. Based on the analysis of the presentations and discussions of the meeting, taking in consideration the Lagos Plan of Action (LPA) for the Economic Development of Africa (1980) which stated that:

> *"the major problems confronting Africa in the field of resources development include: lack of information on natural resources endowment and the activities of transnational corporations dealing with natural resources assessment; lack of adequate capacity (capital, skills and technology), for the development of these resources; ....."*

and noting that:

(a) despite the development of many powerful tools such as remote sensing and geographic information systems (GIS) for the collection and analysis of data for natural resources development much has not improved since the Lagos Plan of Action was adopted.

(b) there has been minimal appreciation for the new techniques stated above in (a) which contributed to the lack of proper management of information for natural resources and energy planning.

(c) changing strategies in Africa to attempt to plan for sustainable development have revealed the importance of improving the available data base used for planning for natural resources and energy.

(d) the potential use of remote sensing and GIS to provide and organize spatial, temporal contextual data has been adequately demonstrated and recognized throughout the world;

(e) few African countries have seriously taken advantage of the capability of both remote sensing and GIS in planning and managing their resources for sustainable development.

(f) there was a general lack of a common and multi-purpose resources database at the national and regional levels. Even the limited spatial information on resources cannot be effectively integrated into the planning process for various reasons among which are:

i. the fact that there are no comprehensive documentations about the sources of information, which makes researches more costly and time consuming;

ii. the fact that their cartographic projections are neither compatible nor are they known;

iii. the fact that access to them are sometimes prohibited or restricted in some way;

iv. the fact that different classification schemes and nomenclature are used for the same resource component by different institutions;

v. the fact that there is limited internal funding;

(g) It was further noted that skills in both remote sensing and GIS have not reached a "critical mass" which is essential for effective operational use for both of these technologies in most African countries;

(h) It was observed that there is a lack of coordination and cooperation among national institutions, and among African countries on the acquisition, management and exchange of resource information;

(i) It was further realized that there is hardly any indigenous entrepreneurship in the development and management of resource information in Africa.

210. The Group of Experts **recommends**

(a) African Governments should recognize the critical role which should be accorded to the acquisition and management of resource information particularly using the modern techniques of remote sensing and GIS;

(b) African Governments should develop resource information policies addressing issues concerning standardization compatibility of formats, data accessibility and exchange of information;

(c) African Governments should make adequate budgetary allocations for data acquisition and the management of resource information;

(d) African Governments are therefore urged to carry out institutional changes that would enhance timely provision of information to district and local communities as well as to regional institutions;

(e) African Governments should strengthen capacity building by introducing and

expanding educational and training programmes in resource information technologies and to provide long-term financial support for applied research relevant to resource information;

(f) African Governments should encourage the private sector and NGO's and create good working relationships in the development and promotion of resource information;

(g) African Governments should participate in the formation of national and continent-wide linkages among professionals that are engaged in resource information for natural resources management;

(h) African Governments should provide funding to institutions involved in the development and management of resource information;

(i) African Governments should encourage its institutions to promote as far as possible self-reliance in the development, management and utilization of resource information.

VI. ADOPTION OF THE REPORT

The Experts considered the draft report and the recommendations of the meeting and made some amendments which were incorporated in the final report.

V. CLOSING SESSION

Mr. Mwanza, Chief of the Natural Resources Division, on behalf of Mr. Layashi Yaker, UN Under Secretary General and ECA Executive Secretary, congratulated the Experts for their positive contributions towards the success of the meeting and pointed out that, as indicated by Mr. Yaker in his introductory statement, ECA would maintain this ad hoc Group of Experts as a high level advisory group, and would consult it on a regular basis. He also expressed the hope that the Experts will play a catalytic role in the implementation by mineral development actors of the Continent of the recommendations of the ad hoc Experts Group Meeting. Talking on behalf of the Experts, **Mr. Yed Angoran** of Côte d'Ivoire congratulated the UNECA Secretariat for having taken the initiative to bring together experts from selected African countries to discuss the very important issue of the sustainable development of Natural Resources and Enregy in Africa, and paid tribute to all who have made contributions towards the successful conclusion of the meeting.

LIST OF PARTICIPANTS

Dr. Nkambwe M.,
Senior Lecturer, University of Botswana
Tel: 267 31 351151
Fax: 267 31 356591

Mr. Simanga Ngovi Ngulu,
Directeur Général de l'EGL
B.P. 1912, Bujumbura
Tel: 225504/26/8546 Tx 5066
Fax: 257 224157

M. Jean Marc De Commarmond,
Directeur Exécutif; Institut de l'Energie des Pays ayant en commun l'usage du Français (IEPF)
56, Rue St Pierre, 3è Etage
Fax 1 148 692-5644
Quebec, Canada G1K 4A1

Mr. Abubakar Jauro,
Executive Secretary, Lake Chad Bassin Commission
P.O.Box: 727, Ndjamena, Chad
Fax/Tel: 235 514137
Tx 5251 KJ

Mr. Angoran Yed. I,
Former Minister of Mines and Energy
17Bp 57 Abidjan 17
Tel: 434053
Fax: 225 433022

Ms. Attia Fatma,
Director, Water Research Centre Building
El Kanater El Khairiya, Egypt
Tel: 2184948/283
Fax: 2188729/2189153

Mr. Hadgu G. Medhin,
General Manager; Ethiopian Mapping Authority
Tel: 251-1-515901
Fax: 251-1-515189
P.O.Box : 597
Addis Ababa, Ethiopia

Dr. Zeoudi Abate,
General Manager; Environment Protection Authority
P.O.Box : 1034
Addis Ababa, Ethiopia

Mr. Wodaje Abebe
Director ARDCO
P.O.Box: 4360
Addis Ababa, Ethiopia

Mr. Sultan Tilimo,
Protection Manager
Wood Biomass Inventory and Strategic Planning Project (WBISPP)
P.O.Box: 62158
Addis Ababa, Ethiopia

Mr. Geoffry J. King,
Team Leader (WBISPP)
P.O.Box : 62158
Addis Ababa, Ethiopia

Mr. A Kefyalew,
P.O.Box : 4916
Addis Ababa, Ethiopia

Mr. Pascal Gayama,
Assistant Secretary General O.A.U.
P.O.Box : 3243
Addis Ababa, Ethiopia

Mr. Kwasi Barning,
Director Planning & Policy Analysis
Minerals Commission
P.O.box : M.248, Accra
Tel Off. 772783/86
Fax (233 21) 773324

Mr. Ayibotelel Nii Boi,
Director, Water Resources Research Institute
P.O.Box M.32, Accra
Tel 775361/2
Fax: 233 21 777170

Prof. Peter O. Adeniyi,
Laboratory for Cartography and Remote Sensing, University of Lagos, Nigeria
Tel: 820191
Fax: 234 1 617075/820191

Mr. Amadou Diallo
Chief, Division Energie ECOWAS
6, King George V Road
P.M.B. 12745, Lagos
Tel: 636839/41/064/0398
Fax: 234 636822

Mr. Jean P. Thomas
Programme Energie, ENDA-TM
Fax: 221 222695
Dakar, Senegal

Mr. Sibi Bonfils
Deputy Director, IEPF
56, Rue Saint Pierre, 3ème Etage
Québec, Canada G1K4 a1
Tel 1 418 6925727
Telex: 210513024

Mr. Jose Pedro Tonet
Dept. S.A.D.C.
P.O.Box: 2876
Luanda, Angola
Tel: 244 2 345288/345147
Telex: 34 3003

Mr. Mageed Yahi Abdel, Consultant
P.O.Box : 1754, Khartoum
House No 37
17 king Abdelaziz Road Amarat
Tel : 445063 Tx 24204
Fax: 249 11 451359

Mr. Nok Frick
Director
Geological Survey
Private Bag x 112
Pretoria 0001
Republic of South Africa
Telex: 350286
Tel: (12)841 1230
Fax: (12)841-1203 1221

Mr. David E.H. Murangari
Permanent Secretary
Minister of Mines
Private Bag 7709 Causeway
Tel: (263-4)732881/8
Fax: 793065 Tx 22416ZW
Harare, Zimbabwe

ANNEX

ECA SECRETARIAT

Dr. Peter N. Mwanza,
Chief, Natural Resources Division,
P.O.Box : 3001
Telex: 21029 UNECA
Tel: 1 2511 51 58 32
Fax: 251-1-51-44-16
Addis Ababa, Ethiopia

Prof. S.K. Imbamba,
Regional Adviser on Environment, MRAG

Mr. Haile Leul Tebike,
Regional Adviser on Energy, MRAG

Mr. Pierre A. Traore,
Chief, Mineral Resources Unit,
NRD/MRU

Mr. Yama N. Albert,
Affairs Officer,NRD/MRU

Mr. F. Moshi,
Economic Affairs Officer, NRD

Mr. Yuri Pashkov,
Chief, Energy Resources Unit, NRD

Mr. P. Niyimbona,
Economic Affairs Officer, NRD

Mr. A. Hoque,
Chief, Water, Environment and Marine
Section, NRD

Mr. Atoumane Dieye,
Economic Affairs Officer, NRD

Mr. Yilma Wolde Emmanuel,
Economic Affairs Officer, NRD

Mr. Orlando Nino-Fluck
Chief, Cartography and Remote Sensing
Unit, NRD
Tel: 251 1 510275

Mr. Abdishakour Gulaid,
Cartographic Affairs Officer, NRD
Tel: 251 1 510275